RCA integrated circuits

Digital Line II

New Product News

Look to RCA for the Big News in Digital Integrated Circuits

RCA's Expanding Line Now Includes:

- 3.6ns ECCSL
- 2.3mW DTL
- Medium Power DTL
- COS/MOS Complementary-Symmetry MOS

RCA Electronic Components

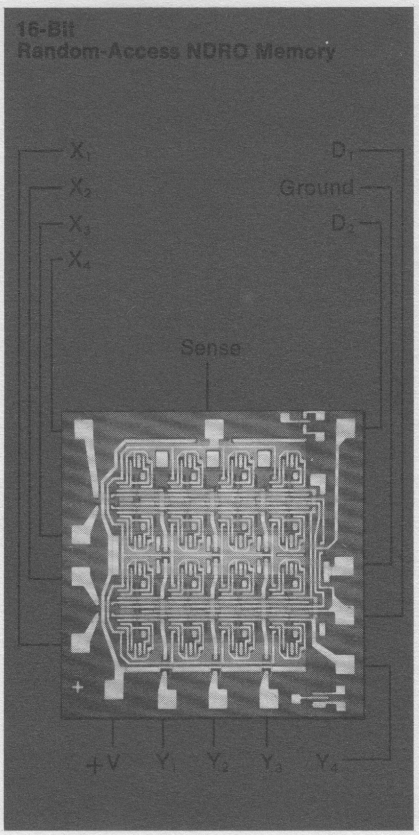
Harrison, New Jersey 07029

RCA COS/MOS

New Logic/Memory Technology

New Dimensions in Digital System Design

COS/MOS, RCA's complementary-symmetry MOS technology is establishing itself as one of the truly significant new developments in integrated circuitry. The ability of this technology to produce both logic and memory circuits coupled with its capacity for large scale integration is providing growing evidence that it will have a major impact on the size, performance, complexity and economics of future military and commercial digital equipment.



To the Digital System Designer, COS/MOS offers the advantages of ultra-low quiescent power dissipation; 4 volt noise immunity; −55 to +125°C operation; circuit operation that is relatively independent of the individual MOS transistor characteristics; fan-outs up to 50; 10 volt logic swings—a growing choice of circuits — from gates and complex functions to memory cells to LSI; and an attractive economic outlook.

Briefly, COS/MOS utilizes pairs of "N" and "P" MOS transistors in complementary configurations as logic elements. In either high or low logic state, one transistor of the pair is "off" and the other is "on". This assures that there is always a very high resistance present from power supply to ground, thus limiting the quiescent leakage through the pair to the picoamp range. The low impedance conductive path of the "on" transistor provides relatively fast switching speeds and limits the transient power dissipation. The high input impedance of COS/MOS contributes to the circuit's high fan-out capability. Characteristic of MOS circuitry, COS/MOS is capable of considerably higher circuit density per chip area and involves fewer processing and masking operations than bipolar IC's.

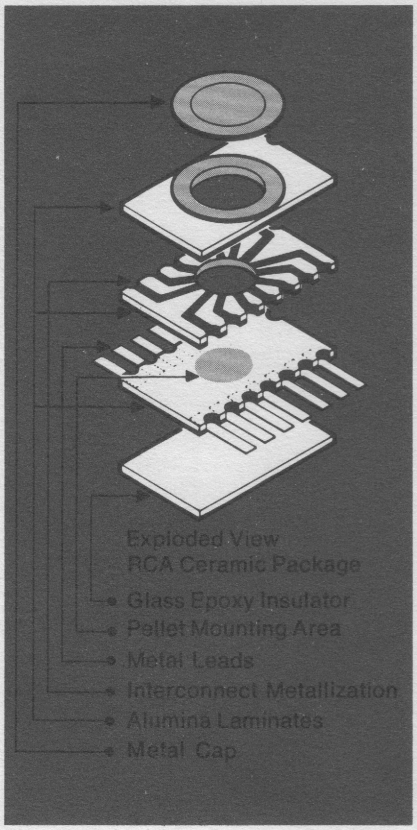
A Major Technology Breakthrough at RCA. The circuit advantages of the complementary mode of operation has been known for some time. However, the ability to produce N and P type MOS transistors on the same substrate represents a major technology breakthrough. With COS/MOS, the circuit and systems designer can now begin serious planning of a complete, compatible economical system — encompassing both logic and memory.

COS/MOS types available are listed inside this booklet. For data on any of these types, write Commercial Engineering, RCA Electronic Components, Harrison, N. J. 07029. To order samples, contact your RCA Representative. Or ask your RCA Distributor for his price and delivery.

RCA
CD2300 Family

Medium Power DTL

In RCA's three CD2300 DTL series, you get direct 830 and 930 series interchangeability PLUS economy and RCA's total product control. This over-all design and fabrication quality program includes:



Process Features designed to build in extra reliability at no premium in price. Inherent in RCA's processing of these types, are:

- diode protection under each bonding pad
- phosphorus glass protection against channel inversion
- tough glass protection of pellet surface and metallization
- ultrasonic bonding
- in-house package manufacture

Computer Process Control provides a new level of process uniformity in RCA's CD2300, CD2300D, and CD2300E series. Computer probe of each wafer lot permits rapid feedback of process-control information to assure precise parameter centering from lot to lot.

Packaging, designed and built by RCA, means extra ruggedness and reliability. RCA's unique ceramic flat-pack and dual-in-line packages offer hermeticity, −55° C to +125° C operation plus these important features:

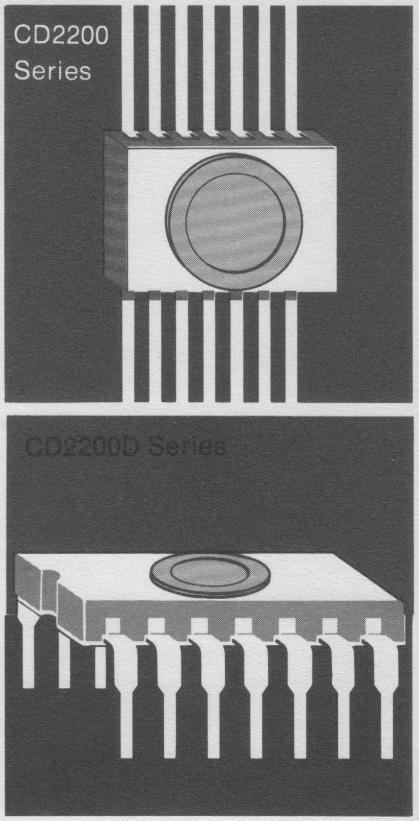
- all high-temperature fabrication steps are completed *before* the pellet is mounted in the package
- package leads do not pass through package seal. Lead forming or abuse can *not* affect hermeticity
- final weld seal

Check the List of RCA CD2300, CD2300D, and CD2300E series on the inside of this booklet for your 830 and 930 requirements. For further information, call your RCA representative. Or call your RCA distributor for his price and delivery.

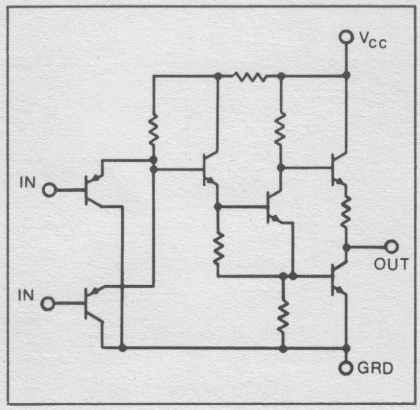
RCA
2.3mW DTL

In two package styles

2.3mW/gate dissipation
7mW/Flip-Flop dissipation
noise immunity 1.2 volts
−55°C to +125°C operation
+3.8 to +6.3v supply



CD2200, CD2200D Series

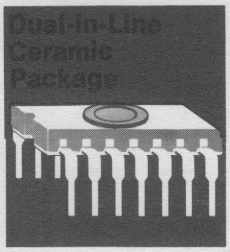
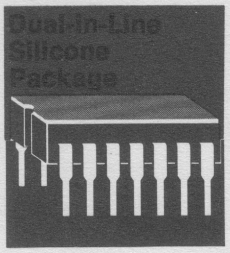


- High breakdown voltage base collector input diodes
- Low-impedance T^2L type output Excellent capacitive drive capability
- High noise immunity, 1.2V (typ) @ 25°C

			Price (1000 units)
CD2200 CD2200D	**Dual 4-input Gate**	Two NAND gates 4 inputs/gate, one output/gate Node terminal for fan-in expansion on each gate	$3.15
CD2201 CD2201D	**Quad 2-input Gate**	Four NAND logic gates Two input/gate One output/gate	3.30
CD2202 CD2202D	**Dual 4-input Buffer Gate**	Two NAND logic gates 4 inputs/gate one output/gate Node terminal for fan-in expansion on each gate	3.30
CD2203 CD2203D	**J-K Flip-Flop**	J-K Flip-Flop with complementary outputs 2 DC set inputs/2 DC reset inputs 2 "J" and 2 "K" clock steering inputs/split clock line	4.20
CD2204 CD2204D	**Dual 4-input Gate Expander**	Two 4-input expanders for use with other devices in RCA-CD2200 and CD2200D Series	2.25
CD2205 CD2205D	**Dual 3-input Gate with "wired OR"**	Two 3 input AND gates plus inverter Gate outputs can be wired to inverter input for "wired OR"	3.15

RCA
CD2300 Family

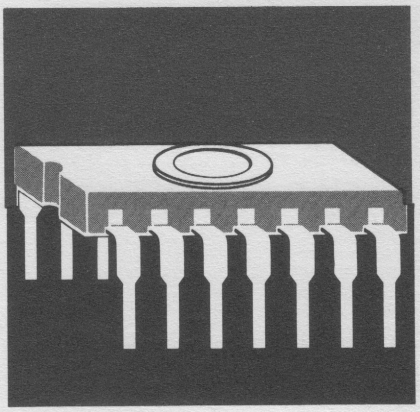
Direct Replacements for 830 and 930 DTL

Description and Pull-up resistance	−55°C to +125°C Operation				0°C to +75°C Operation	
		Price (1000 units)		Price (1000 units)		Price (1000 units)
NAND Gates						
Dual-4 Expandable (6KΩ)	CD2300/930	$2.50	CD2300D/930	$2.50	CD2300E/830	$1.05
Dual-4 Expandable (2KΩ)	CD2301/961	2.50	CD2301D/961	2.50	CD2300E/861	1.05
Dual-4, High Fanout, Expandable (transistor output pull-up)	CD2306/932	2.75	CD2306D/932	2.75	CD2306E/832	1.15
Dual-4, High Fanout, Expandable (no output pull-up)	CD2307/944	2.75	CD2307D/944	2.75	CD2307E/844	1.15
Triple-3 (6KΩ)	CD2308/962	2.75	CD2308D/962	2.75	CD2308E/862	1.15
Triple-3 (2KΩ)	CD2309/963	2.75	CD2309D/963	2.75	CD2309E/863	1.15
Quad-2 (6KΩ)	CD2302/946	2.75	CD2302D/946	2.75	CD2302E/846	1.15
Quad-2 (2KΩ)	CD2303/949	2.75	CD2303D/949	2.75	CD2303E/849	1.15
Hex Inverters						
Diode Input (6KΩ)	CD2310/936	2.90	CD2310D/936	2.90	CD2310E/836	1.45
Diode Input (2KΩ)	CD2311/937	2.90	CD2311D/937	2.90	CD2311E/837	1.45
Expandable Input (6KΩ)	CD2312	2.90	CD2312D	2.90	CD2312E	1.45
Expandable Input (2KΩ)	CD2313	2.90	CD2313D	2.90	CD2313E	1.45
Flip-Flops						
Clocked RS JK Capability, (6KΩ)	CD2304/945	3.00	CD2304D/945	3.00	CD2304E/845	1.90
Clocked RS JK Capability, (2KΩ)	CD2305/948	3.00	CD2305D/948	3.00	CD2305E/848	1.90
Input Expander						
Dual 4-Diode	CD2314/933	2.25	CD2314D/933	2.25	CD2314E/833	.90

RCA COS/MOS

Complementary-Symmetry MOS

Ultra-Low power dissipation
single 10-volt power supply
10-volt logic swing
4 volts noise immunity
Fan-outs up to 50
−55°C to +125°C operation
Ceramic Dual-in-line package

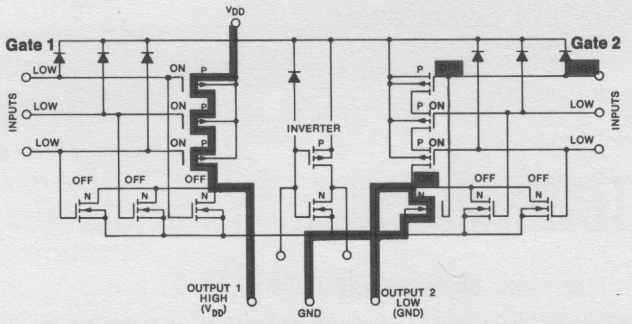


RCA Type	Pkg		Price (1-99)	Price (1000 units)
CD4000D	DIC	Dual 3-Input Gate & Inverter	$13.05	$9.00
CD4001D	DIC	Quad 2-Input Gate	$13.05	$9.00
CD4002D	DIC	Dual 4-Input Gate	$14.50	$10.00
CD4003D	DIC	Dual "D" Type Flip Flop	$20.30	$14.00
CD4004T	TO-5	7-Stage Counter/Divider	$31.90	$22.00
CD4005D	DIC	16-Bit NDRO Memory	$23.20	$16.00
CD4007D	DIC	Dual Complementary Transistor Pair & Inverter	$9.90	$6.00

(COS/MOS types in ceramic flat pack — without suffix letters shown in designations above — available at slightly higher prices.)

COS/MOS Operation

To demonstrate the operation of COS/MOS integrated circuits, the TA5361 schematic is shown with its two gates in different logic states.



Gate 1: All inputs are in the "low" state
P channel units are on
N channel units are off
Output 1 is in the "high" state (V_{DD})

The extremely *high* impedance of the three parallel "N" units in the off condition limits leakage to a few picoamperes. The extremely *low* impedance of the three series "P" units provides fast switching and an output logic level within 10mV of V_{DD}.

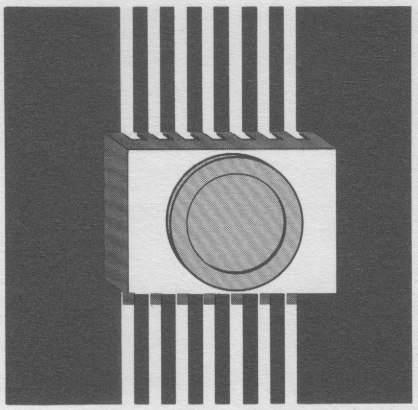
Gate 2: One input is in the "high" state
Associated P unit is off
Associated N unit is on
Output 2 is in the "low" state (GND).

The "P" unit in the off condition now introduces an extremely high impedance in the path from V_{DD} to output 2. The "N" unit provides a *low* impedance path between output 2 and ground. Logic output level is within 10mV of ground.

RCA ECCSL

Ultra-High-Speed Emitter-Coupled,
Current-Steered Logic (OR/NOR Positive Logic)

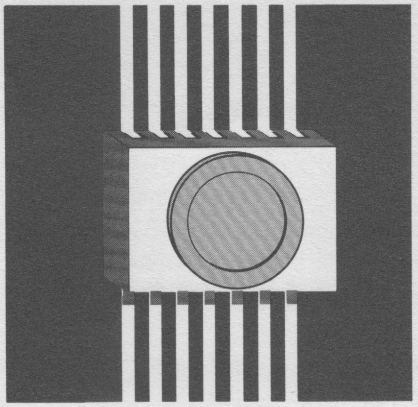
3.6ns ECCSL (1'+10pf)
7.5ns (6+60pf)
noise immunity 40% of logic swing
+10°C to +60°C operation
−4.5 to −5.5V supply



Type			Price (1000 units)
CD2150	**Dual 4-input Gate**	Two gates, 4-inputs/gate one OR output, one NOR output	$2.40
CD2151	**Dual 4-input Gate with "wired OR" Capability**	Same as CD2150, with NOR output resistors eliminated. NOR outputs can be connected together or combined with outputs from other devices in this series for "wired OR"	2.40
CD2152	**Eight-input Gate with "wired OR" Capability**	Single 8-input gate one OR output, one NOR output with termination resistor option. Without resistors, can be "Phantom ORed"	2.40
CD2153	**Quad Two-input NOR Gate with "wired OR" Capability**	Four gates, each gate has 2 inputs, one NOR output. Output resistors are omitted for "wired OR" operation	3.15

High-Speed Emitter-Coupled, Current-Steered Logic
(OR/NOR Positive Logic)

6ns High-Speed ECCSL (1+10pf)
24ns (6+60pf)
noise immunity 40% of logic swing
−55°C to +125°C operation
−4.68 to −5.72V supply



CD2100	**Dual 4-input Gate**	2 gates, 4 inputs/gate one OR output, one NOR output	$3.75
CD2101	**Quad 2-input Gate**	4 gates, 2 inputs/gate one NOR output/gate	3.95

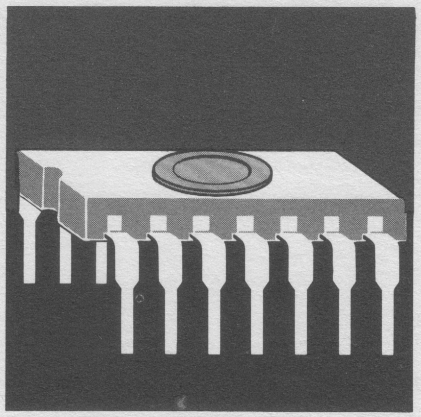
Coming! 2ns Emitter-Coupled, Current-Steered Logic. Non-saturated, high-speed switching for your extremely high-speed requirement

For information on RCA Digital Integrated Circuits, contact your RCA Representative.
Or check your RCA Distributor for his price & delivery.

RCA's Growing Line of Digital Circuits Now Includes:

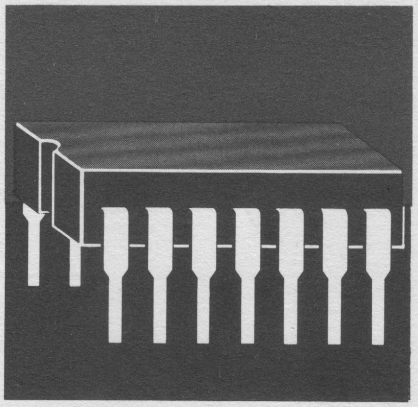
Low-Power DTL (2.3mW/Gate)

CD2200 Series in 14-Lead Ceramic Flat Pack
CD2200D Series in Dual-In-Line Ceramic Package
for −55°C to +125°C Operation
Compatible with CD2300 and CD2300D Series
Medium Power DTL



Medium-Power DTL

CD2300 Series in 14-Lead Ceramic Flat Pack
CD2300D Series in 14-Lead Dual-In-Line Ceramic Package
CD2300E Series in Dual-In-Line Silicone Package
Direct Replacements for 830 and 930 Series DTL

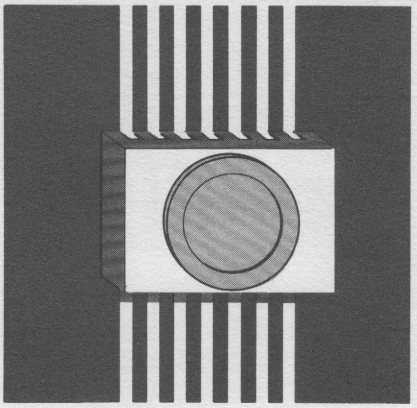


Ultra-High Speed ECCSL

CD2150 Series Emitter Coupled,
Current Steered Logic in 14-Lead Flat Pack
3.6ns Stage Delay

Ultra-Low-Power COS/MOS

Complementary-Symmetry MOS Integrated Circuits
Gate-Level and MSI Complexity



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